

4.29 Sprinkler Protection Requirements For Parking Spaces Associated With Electric Vehicles (EV) Charging Stations (2025)

Reference: 2025 NFPA 13 Sections 4.3.5, A.4.3.5(9), 19.1.2(1), 19.2.1.2.4(2)(3), and 19.2.3.1.1(1); 2025 California Fire Code (CFC) 903.3.1.1 and 903.3.5; 2025 SFFD Administrative Bulletin 2.04.

Scope: To provide additional SFFD guidelines for sprinkler protection of parking spaces associated with electric vehicle (EV) charging stations not specifically addressed in 2025 NFPA 13. This bulletin applies for all occupancies (except R-3), having Level 3 or Level 4 EV charging stations. (This bulletin does not apply for Level 1 and Level 2 chargers). Additional guidelines are also provided for parking space(s) associated with EV charging station(s) in partially sprinklered or nonsprinklered buildings.

Purpose: The intent of the higher-risk sprinkler protection for these specific EV charging parking spaces is to mitigate the additional potential higher-risk associated with the EV charging process while the charging station is connected to the EV via a charging port, in comparison to common (Non-EV) parking spaces which are required to be protected by an Ordinary Hazard (OH) sprinkler design density over a 1,500 square foot (SF) area (per 2025 NFPA 13 Section 4.3.3.2 and Table 19.2.3.1.1).

The installation of new EV parking-charging stations in new and existing parking garages is not directly/adequately addressed in the current codes or standards. The EV's large battery (energy storage system - ESS) which can reach 100 kWh for cars with lithium-ion batteries, in combination with EV charging, is potentially a high fire hazard condition due to potential damage issues of batteries, potential thermal runaway, cascading ignition/fire, and difficulties of extinguishing of an inaccessible fire due to extreme temperatures and concealed batteries. EV charging in an enclosed space/structure potentially increases firelife safety hazards to building occupants, structures, adjacent vehicles, and first responders.

Per the 2016 Edition of NFPA 13 Section 5.3.1 and A.5.3.1(1), automobile parking garages were required to have an Ordinary Hazard Group I (OH1) sprinkler design density with 0.15 GPM/SF over 1,500 SF (per Table 11.2.3.1.1). However, per the current 2025 NFPA 13 Sections 4.3.3.2 and A.4.3.3.2(2), automobile parking garages are now classified as Ordinary Hazard Group II (OH2) with 0.2 GPM/SF over 1,500 SF area (per Table 19.2.3.1.1). It is NOT the intent of this bulletin to retroactively require a change of EXISTING automobile parking garages OH1 sprinkler design density (0.15/1500) to become OH2 with 0.2/1500 sprinkler design density. However, all NEW automobile parking garages not having EV charging stations, shall be designed per 2025 NFPA 13 with OH2 with 0.2/1500 sprinkler design density.

This bulletin does not apply to Mechanical-Access enclosed parking garages per 2025 CBC Section 406.6.4 which requires a separate specially engineered automatic sprinkler system on a case-by-case basis.

Definition:

1. **Parking Space Associated With An EV Charging Station.** A space within a parking garage that is provided with an EV charging port. (A single charging station may provide EV charging capabilities for more than one parking space utilizing extension charging ports connected to the same charging station).

4.29 Sprinkler Protection Requirements For Parking Spaces Associated With Electric Vehicles (EV) Charging Stations (2025)

I. SPECIFIC SFFD REQUIREMENTS

1. **New Buildings.** The following items shall apply for new buildings with a required sprinkler system:
 - A. **Sprinkler System Design.** For new buildings where a fire sprinkler system is required by code, the following shall apply for design of the sprinkler system:
 - (1) **Designed To EH2.** The fire sprinkler system shall be designed per 2025 NFPA 13 Extra Hazard Group II (EH2) with 0.40 GPM/SF over the parking space(s) associated with EV charging station(s).
 - (2) **Less Than 2,500 SF.** For parking space areas associated with EV charging stations that are less than 2,500 SF, the EH2 design area(s) are required to extend a minimum 3 feet beyond the perimeter of the parking space(s). In this case, the design area(s) are not required to extend 15 feet beyond the permitted parking space(s) as it is currently required by 2025 NFPA 13 Section 19.1.2(1).
 - (3) **Hydraulic Calculation Design Criteria.** The hydraulic calculation design criteria shall include all sprinklers within a minimum 2,500 square feet area of sprinkler operation, or the maximum area containing parking space(s) associated with EV charging Station(s) extending 3 feet beyond the perimeter of the parking space(s), whichever is less, but not less than 1,500 SF that is required for Ordinary Hazard design density. (OH2 Per 2025 NFPA 13 Section and Table 19.2.3.1.1).
 - (4) **Design Area Reduction.** The EH2 design area may be reduced from 2,500 SF to NOT LESS than 2,000 SF if high-temp sprinklers or K-11.2 sprinklers are used at the ceiling per 2025 NFPA 13 Section 19.2.3.2.7.
 - B. **Hose Allowance For New Buildings.** The following shall apply for new buildings with parking spaces associated with EV charging:
 - (1) **Equal To or Greater Than 1,500 SF.** New buildings with parking space(s) associated with EV charging station(s) having a continuous (single) area that is equal or greater than 1,500 SF shall be required to be provided with a hose allowance of 500 GPM.
 - (2) **Less Than 1,500 SF.** Those with a parking space area that is less than 1,500 SF shall be required to be provided with a hose allowance of 250 GPM.
 - (3) **From Point of Connection.** The total required hose stream of either 500 GPM or 250 GPM shall be taken from the point of connection with the city water main per 2025 NFPA 13 Section 19.1.6.
 - (4) **Inside Hose Stream.** An inside hose stream is not required unless Class II hose stations are connected to the fire sprinkler system.

4.29 Sprinkler Protection Requirements For Parking Spaces Associated With Electric Vehicles (EV) Charging Stations (2025)

- C. **New Buildings With Fire Pump/Fire Water Tank.** In new buildings that are equipped with a fire pump system, fire water storage tank, or both, calculations shall be provided to demonstrate that both the fire pump system and water storage tank are adequately sized to supply the required pressure, flow, and duration/quantity. See 2025 NFPA 13 Sections 19.1.5 and 19.1.6.
- D. **New Fire Water Storage Tanks in New Buildings.** The following shall apply for new fire water storage tanks in new buildings:
- (1) **90 Minute Duration.** New fire water storage tanks in new buildings shall be adequately sized to accommodate the fire sprinkler discharge demand for the hydraulically remote area serving the EV parking spaces for a duration of 90 minutes.
 - (2) **Inside Hose Stream.** If the fire water storage tank serves hose valves for fire department use, then an inside hose stream of 100 GPM shall be added to the sprinkler system demand.
 - (3) **Outside Hose Stream.** The fire water storage tank is not required to support any additional outside hose stream unless it is arranged to supply water to outside fire hydrants.
2. **Existing Buildings With Existing Sprinklers.** The following items shall apply for existing buildings with an existing sprinkler system:
- A. **Sprinkler System Design.** The following shall apply for the sprinkler system design:
- (1) **Augment to EH2.** For existing buildings with an existing sprinkler system which is required to protect NEW parking space(s) associated with EV charging station(s), the existing sprinkler system shall be required to be augmented to EH2 with 0.40 GPM/SF sprinkler design density over the parking space(s) associated with EV charging station(s) on a separate sprinkler permit.
 - (2) **Less Than 2,500 SF.** For parking space areas associated with EV charging stations that are less than 2,500 SF, the EH2 sprinkler design area(s) are required to extend a minimum 3 feet beyond the perimeter of the parking space(s). In this case, the design area(s) are not required to extend 15 feet beyond the permitted parking space(s) as it is currently required by 2025 NFPA 13 Section 19.1.2(1).
 - (3) **Hydraulic Calculation Design Criteria.** The hydraulic calculation design criteria of an existing sprinkler system shall include all sprinklers within a minimum 2,500 square feet area of sprinkler operation, or the maximum area containing parking space(s) associated with EV charging station(s) extending 3 feet beyond the perimeter of the parking space(s), whichever is less, but not less than 1,500 SF that is required for Ordinary Hazard design density. (OH2 Per 2025 NFPA 13 Section and Table 19.2.3.1.1 with 0.2/1500 density, or OH1 per the previous 2016 NFPA 13 Section 5.3.1 and A.5.3.1(1) and 11.2.3.1.1 with 0.15/1500 density).
 - (4) **Design Area Reduction.** The EH2 design area can be reduced from 2,500 SF to not less than 2,000 SF if high-temp sprinklers or K-11.2 sprinklers are used at the ceiling per 2025 NFPA 13 Section 19.2.3.2.7.

4.29 Sprinkler Protection Requirements For Parking Spaces Associated With Electric Vehicles (EV) Charging Stations (2025)

- B. **Hose Allowance For Existing Buildings.** The following shall apply for existing buildings with parking spaces associated with EV charging:
- (1) **Equal To or Greater Than 1,500 SF.** Existing buildings with parking space(s) associated with EV charging station(s) having a continuous (single) area that is equal or greater than 1,500 SF shall be required to be provided with a hose allowance of 500 GPM.
 - (2) **Less Than 1,500 SF.** Those with a parking space area that is less than 1,500 SF shall be required to be provided with a hose allowance of 250 GPM.
 - (3) **From Point of Connection.** The total required hose stream of either 500 GPM or 250 GPM shall be taken from the point of connection with the city water main per 2025 NFPA 13 Section 19.1.6.
 - (4) **Inside Hose Stream.** An inside hose stream is not required unless Class II hose stations are connected to the fire sprinkler system.
- C. **Cannot Be Augmented To EH2.** Where an existing, previously approved, fire sprinkler system cannot be augmented to meet the sprinkler design requirements noted in item (2A and 2B) above (without upgrading the fire service and water supply), the following shall apply:
- (1) **Capability of Sprinkler System.** The sprinkler designer shall demonstrate to SFFD the highest capability of the existing sprinkler system in terms of sprinkler water density and sprinkler spacing that is available for protection of the parking space(s) associated with EV charging station(s).
 - (2) **One Hour Fire Rated Wall.** This existing system would be acceptable in addition to providing one-hour fire-rated wall separation.
 - (3) **Maximum Continuous Fire-Area To Be Separated.** The maximum continuous (single) fire-area to be separated by one-hour fire-rated walls, shall not exceed 1500 SF or seven (7) EV charging stations, whichever area is smaller.
- D. **Existing Partially Sprinkered Buildings With Fire Pump And Hose Valves.** In existing partially sprinkler protected buildings that have a fire pump and hose valves for fire department use attached to the wet pipe system, the following shall apply:
- (1) **Fire Pump and Sprinkler Demand.** The fire pump shall accommodate the sprinkler demand serving the EV parking spaces added to the 2024 NFPA 14 determined standpipe demand, and not including a separate hose stream demand. See 2025 NFPA 13 Section 19.1.6.4(3).

4.29 Sprinkler Protection Requirements For Parking Spaces Associated With Electric Vehicles (EV) Charging Stations (2025)

(2) **Capability of Sprinkler System and Fire Rated Wall.** The sprinkler designer shall demonstrate to SFFD the highest capability of the existing sprinkler system to be augmented (highest density and sprinkler spacing and fire pump capability, without upgrading the fire service, fire pump and water supply). This would be acceptable in addition to providing one-hour fire-rated wall separation on three sides to reduce the overall continuous fire-area of the parking space(s) associated with EV charging station(s).

(3) **Maximum Continuous Fire-Area To Be Separated.** The maximum continuous (single) fire-area to be separated by one-hour fire-rated walls, shall not exceed 1,500 SF or seven (7) EV charging stations, whichever area is smaller.

E. **Existing Fire Water Storage Tanks in Existing Buildings.** In existing buildings with existing water storage tanks, the following shall apply:

(1) **Capability of Sprinkler System and Fire Rated Wall.** The sprinkler designer shall demonstrate to SFFD the highest capability of the existing sprinkler system to be augmented (highest density and sprinkler spacing, fire pump capability and water storage tank capacity, without upgrading the fire service, fire pump, water storage tank and water supply). This would be acceptable in addition to providing one-hour fire-rated wall separation on three sides to reduce the overall continuous fire-area of the parking space(s) associated with EV charging station(s).

(2) **Maximum Continuous Fire-Area To Be Separated.** The maximum continuous (single) fire-area to be separated by one-hour fire-rated walls, shall not exceed 1,500 SF or seven (7) EV charging stations, whichever area is smaller.

3. **Waterflow Switch and Sprinkler Monitoring System.** Sprinklered buildings (fully or partially) with Level 3 or Level 4 charger(s), the following shall apply:

A. **Connect to Fire Alarm System/Monitoring System.** Sprinklered buildings (fully or partially) with Level 3 or Level 4 charger(s) shall have a sprinkler waterflow switch connected to the building fire alarm system or to a sprinkler monitoring system.

B. **No Existing Waterflow Switch.** Upon the installation of new Level 3 or Level 4 charger(s) in existing sprinklered buildings without an existing sprinkler waterflow switch, and without a building fire alarm or a sprinkler monitoring system, shall be required to install a new sprinkler waterflow switch and a sprinkler monitoring system per the applicable codes.

C. **Signal To Shutdown Power.** The sprinkler waterflow switch associated with the charger(s) area, upon activation, shall generate a signal to shut down the power for all charger(s) in the affected area.

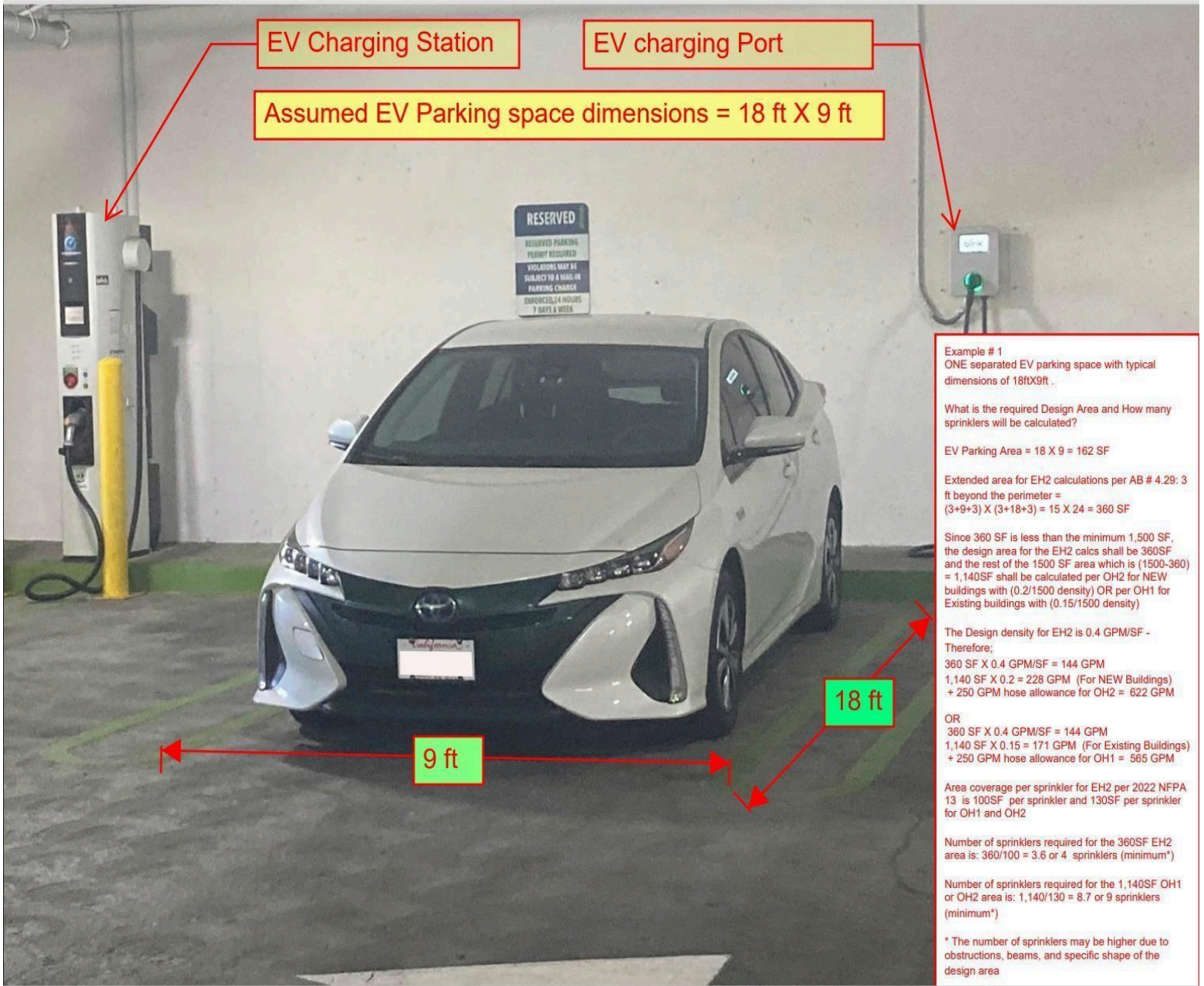
4. **Buildings With No Sprinkler Systems.** Where a fire sprinkler system is not required by code for new buildings, or was not provided in existing buildings, the following shall apply:

4.29 Sprinkler Protection Requirements For Parking Spaces Associated With Electric Vehicles (EV) Charging Stations (2025)

- A. **One Hour Fire Rated Wall.** The parking space(s) associated with EV charging station(s) shall be separated on three (3) sides from all other areas within the garage/building by a minimum of a 1-hour fire-rated wall separation (1-hour fire barrier).
 - B. **Open Side.** The open side shall have a maximum of 10 feet dimension per each parking space, while maintaining the minimum code required egress/access distances/provisions required by 2025 CBC Chapter 10.
 - C. **Maximum Continuous Fire-Area To Be Separated.** The maximum continuous (single) fire-area to be separated by one-hour fire-rated walls, shall not exceed 1,500 SF or seven (7) EV charging stations, whichever area is less.
5. **Performance Based Design and Pre-Application Meeting.** If the specific requirements above cannot be met, the SFFD may allow for a performance based design that meets or exceeds the intent outlined in this bulletin, to be submitted for SFFD review and approval on a case-by-case basis. The applicant may request to have a Pre-Application meeting to discuss specific projects on a case-by case basis.

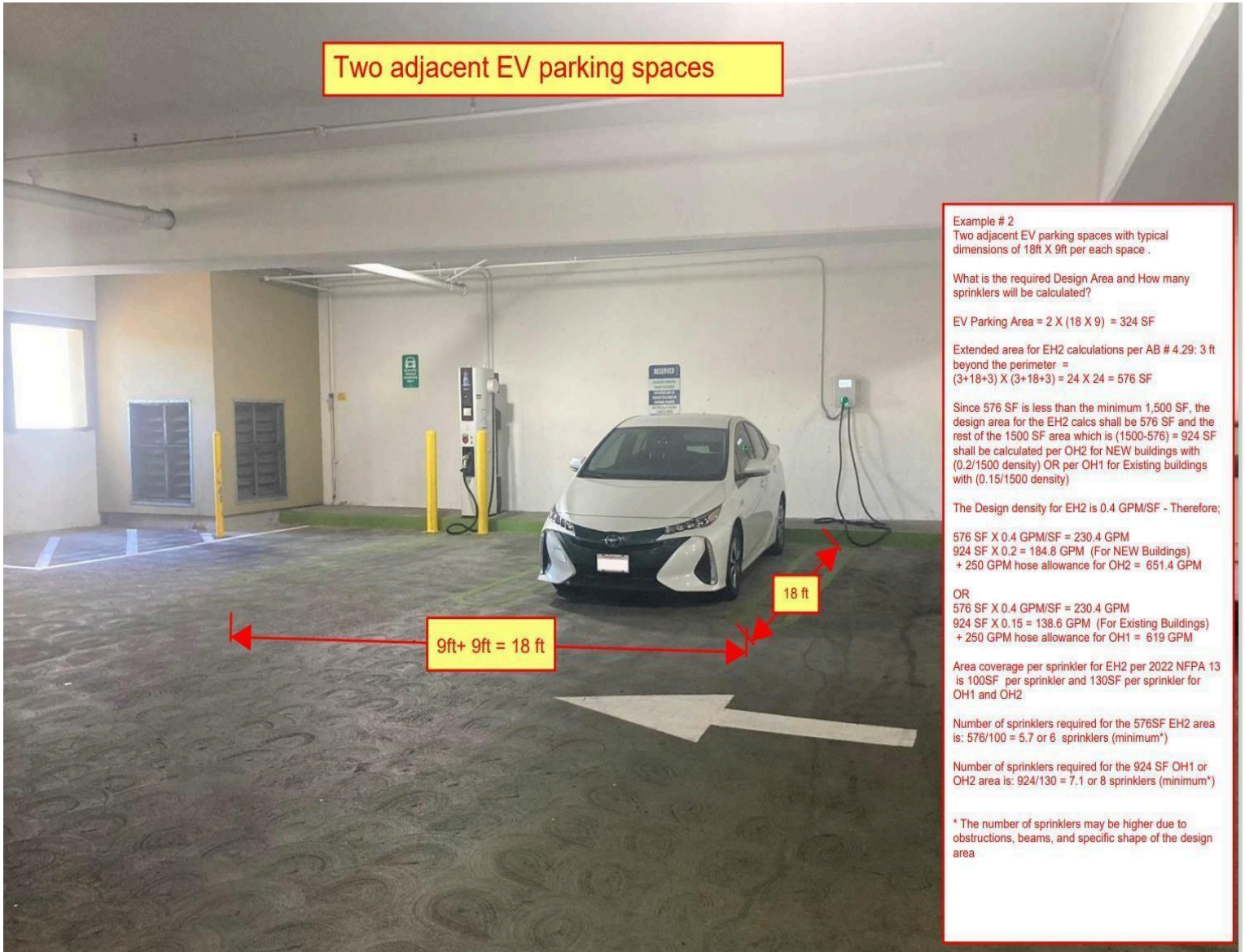
4.29 Sprinkler Protection Requirements For Parking Spaces Associated With Electric Vehicles (EV) Charging Stations (2025)

Figure 1: One (1) Separated EV Parking Space (18 ft x 9 ft)



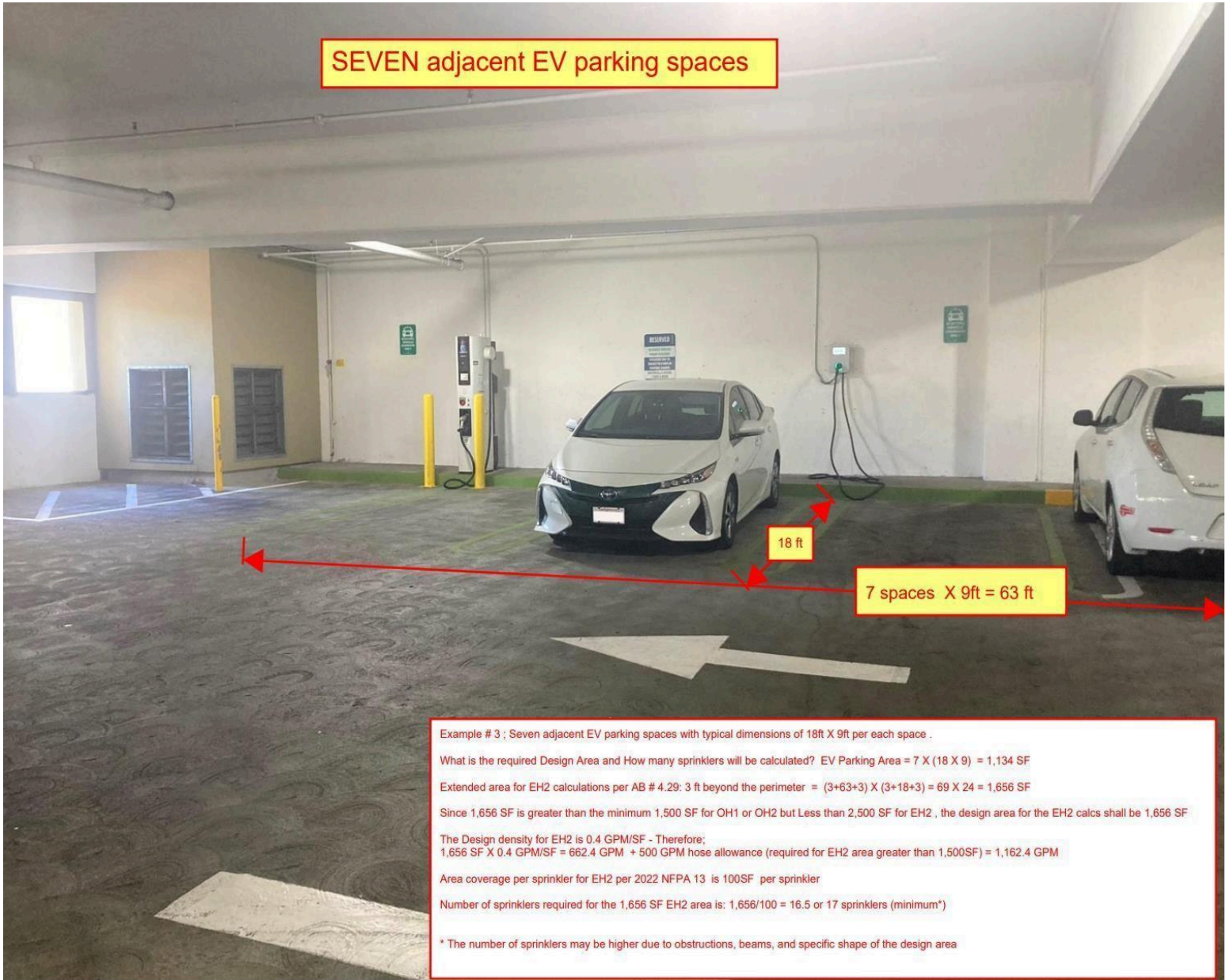
4.29 Sprinkler Protection Requirements For Parking Spaces Associated With Electric Vehicles (EV) Charging Stations (2025)

Figure 2: Two (2) Adjacent EV Parking Spaces (18 ft x 9 ft per space)



4.29 Sprinkler Protection Requirements For Parking Spaces Associated With Electric Vehicles (EV) Charging Stations (2025)

Figure 3: Seven (7) Adjacent EV Parking Spaces (18 ft x 9 ft per space)



4.29 Sprinkler Protection Requirements For Parking Spaces Associated With Electric Vehicles (EV) Charging Stations (2025)

Figure 4: Twenty (20) Adjacent EV Parking Spaces (18 ft x 9 ft per space)

20 adjacent EV parking spaces

18 ft

20 spaces X 9ft = 180 ft

19.2.3.2.6 High-Temperature Sprinklers.
Where high-temperature sprinklers are used for extra hazard occupancies, the area of sprinkler operation shall be permitted to be reduced by 25 percent without revising the density, but not to less than 2000 ft² (185 m²).

19.2.3.2.7
Where K-11.2 (160) or larger sprinklers are used with Extra Hazard Group 1 or Extra Hazard Group 2 design curves and 19.2.3.1.1, the design area shall be permitted to be reduced by 25 percent but not below 2000 ft² (185 m²), regardless of temperature rating.

Example # 4 ; 20 adjacent EV parking spaces with typical dimensions of 18ft X 9ft per each space .

What is the required Design Area and How many sprinklers will be calculated? EV Parking Area = 20 X (18 X 9) = 3,240 SF

Extended area for EH2 calculations per AB # 4.29.15ft beyond the perimeter = (5+180+5) X (5+18+5) = 210 X 48 = 10,080 SF

Since 10,080 SF is greater than maximum 2,500 SF required for EH2 , the design area for the EH2 calcs shall be 2,500 SF

The Design density for EH2 is 0.4 GPM/SF - Therefore:
2,500 SF X 0.4 GPM/SF = 1,000 GPM + 500 GPM hose allowance (required for EH2 area greater than 1,500SF) = 1,500 GPM

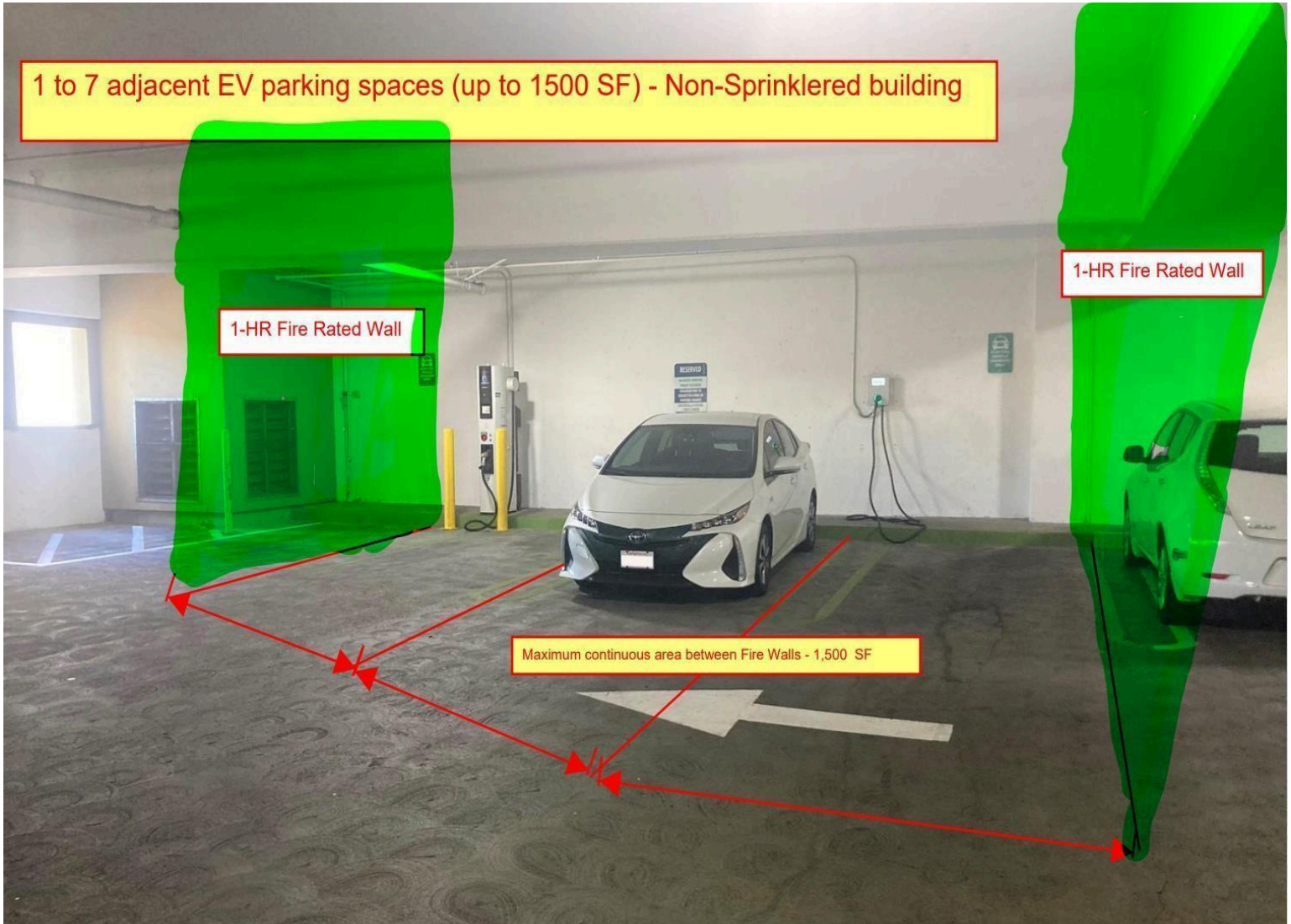
Area coverage per sprinkler for EH2 per 2022 NFPA 13 is 100SF per sprinkler

Number of sprinklers required for the 10,080 SF EH2 area is: 10,080 /100 = 100.8 or 101 sprinklers (minimum*)

* The number of sprinklers may be higher due to obstructions, beams, and specific shape of the design area

4.29 Sprinkler Protection Requirements For Parking Spaces Associated With Electric Vehicles (EV) Charging Stations (2025)

Figure 5: 1-7 Adjacent EV Parking Spaces For Non-Sprinklered Building(18 ft x 9 ft per space)



4.29 Sprinkler Protection Requirements For Parking Spaces Associated With Electric Vehicles (EV) Charging Stations (2025)

Figure 6: One (1) EV Parking Space For Non-Sprinklered Building (18 ft x 9 ft per space)

Single (1) EV parking space separated from other EV parking spaces - Non-Sprinklered building

